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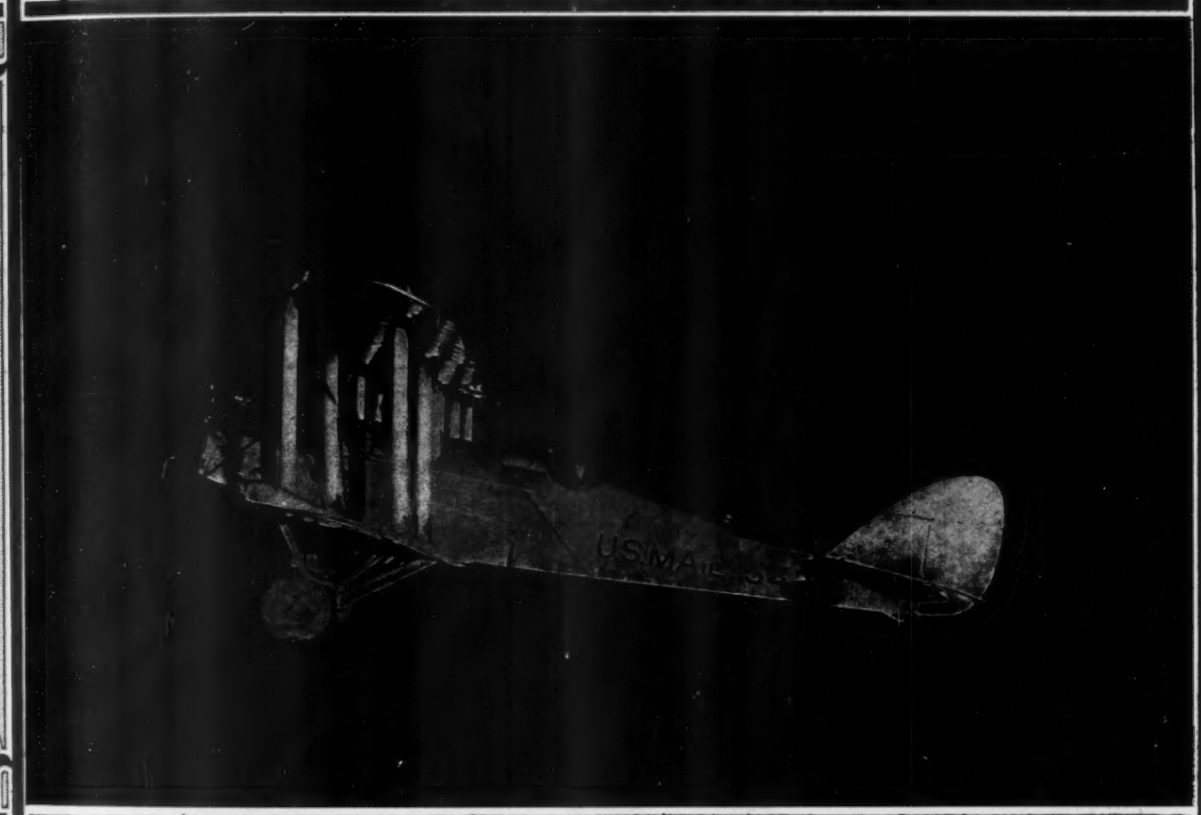

Night mail plane ready to take off—photographed with the sole aid of floodlights

Devoe Photo

VOLUME XVII

NUMBER 21

SPECIAL FEATURES

NEW PIONEER FUEL GAGE DESCRIBED

AIR LEGISLATION IN THE UNITED STATES

THE LATECOERE SINGLE-ENGINED MAIL PLANE

LIGHT PLANE PROGRESS AND THE ENGINE QUESTION

GARDNER PUBLISHING CO., Inc.
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225 FOURTH AVENUE, NEW YORK

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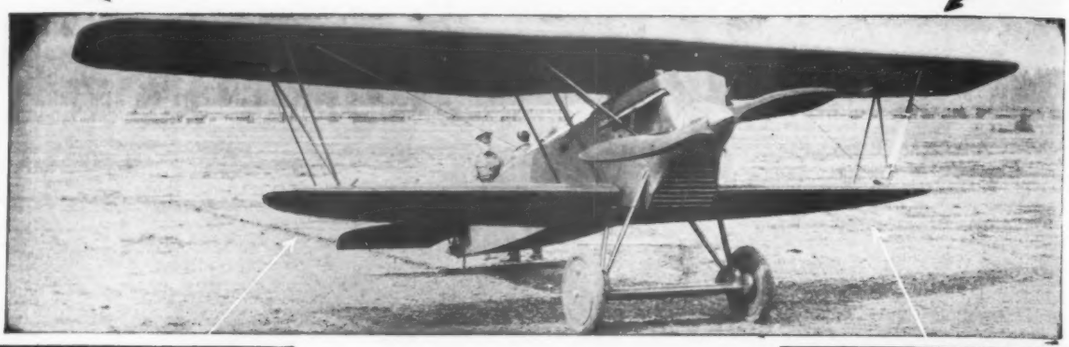

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NOVEMBER 24, 1924

AVIATION

VOL. XVII. NO. 21

Published every Monday

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VOL. XVII NOVEMBER 24, 1924 No. 21

Good News from Washington

THE aviation situation in Washington is without a parallel in intensity since the War boom.

The General Board of the Navy, which consists of the top officers of the Navy and Marine Corps, has spent five hours a day for over a month listening to aeronautical testimony from all sources. They have even gone flying, which for men of their natural conservatism is a triumphal achievement for aerial progress. That the Navy is going to look on its Bureau of Aeronautics more seriously than in the past is plain. There are some who believe that it may be made a separate corps.

But, by all indications, the most important development since the President announced his interest in aviation, is the rumored conversion to the idea of an Independent Air Force of one of the most important figures in American aviation, perhaps the most important. Until he publicly announces his views it would not be proper to comment on this interesting development, but the inferences to be drawn from it can be suggested. Until recently Brig. General Mitchell has been the target for all who opposed any independent air activity of the Government. His active personality, coupled with an imagination that can see air forces supreme in future world conflicts, has been the center of as bitter criticism as any officer ever received. He has carried on his campaign almost single handed within the Army, against the Navy and to the general public. But it appears that the situation has taken a new turn. It is not General Mitchell's fight any more. It can now be predicted that the whole Air Service will be able to say what it has thought ever since the War, that certain, if not all air work of the Government should be under separate direction from the Army and Navy. It is enough to say this. Let the winter come with its new lineup.

The Budget for next year is prepared and awaits the convening of Congress. The efforts of AVIATION to compile the cost of all aeronautical activities have had this effect. Hereafter moneys that are appropriated for the construction of aircraft will probably go to the aircraft industry and not to government aircraft factories or back to the treasury. What the appropriations will be can only be surmised, but of one thing everyone can be certain, the Director of the Budget has made a complete survey of all government aeronautical work and his recommendations will be based on direct information rather than hearsay.

As can be seen, the whole air problem will be given a new impetus as soon as Congress opens. Everyone should make every effort to give to this work a personal interest which will bring aviation into its own next year.

The Swing of the Pendulum

DURING the early years of aviation all planes had low powered motors. This was not because the pilots wanted low power, but because no other motors were available. These early machines were dreadfully under powered and in consequence very dangerous, so that low power and danger became firmly associated in the aviator's mind. With the war came high power motors and it became the fashion to obtain performance by piling up horsepower. "You can fly. a barn door if you put enough power behind it" was the popular catch word.

From 1912 to 1921 the whole trend of development was toward more and more power. Three years ago it was considered necessary to have 100 hp. in a two passenger training plane and 150 hp. to get a good performance out of a machine. Then, with the pressure for economy came the development of the light plane which flew with less than 10 hp. and gave a pretty creditable performance on less than 20 hp. It was found that just because the horsepower was low it did not necessarily follow that a machine was underpowered. However, among many designers there seems to be a tendency toward increasing the horsepower of light planes. They say that it is not possible to build a two-passenger plane of 30 hp. which will be strong enough and have a good enough performance to meet service requirements. Comments were freely passed at Dayton that it was foolish to play around with such low powers and that larger motors would have to be used.

From the immediate point of practical application this may be so, but it must be remembered that a power plant of low horsepower means low initial cost and low fuel cost. A cheap power plant is the key to commercial aviation. It should not be forgotten that for eight years aeronautical engineers piled up horsepower because this was the line of least resistance in producing a machine that performed. It is undoubtedly easier and will bring quicker results to add to the power of light planes, but in the long run performance should be obtained by refinement of the structure and aerodynamic design rather than by increased power. For this reason it is felt that in light plane competitions the motors should have a top limit of power which is no higher than at present and that the prizes should be so arranged as to give a premium to the machines with the least horsepower and the greatest power economy.

Air Legislation

WHAT governmental regulation of civil aviation means in Great Britain, and how it functions, is ably presented in this issue by C. G. Grey, Editor of *The Aeroplane*. Whether our readers approve of the creation of such regulations in the United States or not, it is to be noted that the British regulations follow the provisions of the International Air Convention. Hence, if this country should become a party to this Convention, the same regulations would have to be enforced.

Beginning with our next issue we will publish a number of opinions on air legislation which have been gathered from members of the American aeronautic world.

Air Legislation in the United States

By C. G. GREY

Editor of *The Aeroplane*, London

One of the most amazing and amusing things about American aviation to any visitor from Europe is the fact that anybody in America can put together a few bits of stick and fabric and an engine, persuade it into the air by hoping for the best, call it an airplane, and proceed forth to "ply for hire or reward" without fee, license, registration, airworthiness certificate or anything else to show that the owner and pilot are competent to fly or are worthy to be trusted with the lives of their fellow-citizens.

Where the Air is Still Free

This state of affairs is the more extraordinary because America is, in the words of a perfectly good American citizen, the most law-ridden country in the world. Outside the liquor question, there are more prohibitions in the States than ever there were in pre-War Germany where so many things were "verboten". You must not drive automobiles fast, you *must* stick in a string of slow vehicles although half the road is empty. You must not do this and you must do that, just because the Law says so and not necessarily because it is right or reasonable. One would have thought that in such a law-abiding country air laws could have been welcomed.

Presumably it is because the air is the only portion of the United States in which Freedom is still free that most people concerned with flying are so bitterly opposed to the Winslow Bill or to any other form of air legislation. The opponents of air laws probably feel that if any regulations come into being they will be enforced to the limit, like the liquor and automobile laws and that it will only be possible to break them at considerable expense.

The difference between American laws and English laws seems to be that in America one needs a lot of money to break the law and that in England one only needs a little tact. Laws in England seem to be made on the understanding that they will bend without breaking. For example the English speed limit for automobiles is 20 mi./hr., consequently the police raise no objection to 30 mi./hr. in the streets, and on the open road they do not trouble about speed as long as it does not endanger the public. For similar reasons our air laws cause very little trouble, although they can be and are enforced against any aviator who is a public danger or a public nuisance.

English Control of Civil Aviation

In England all civilian flying is controlled by the Department of Civil Aviation, which is under Sir Sefton Brancker. Laws governing civil aviation amount to this:—

Every civilian pilot must have either an (A) license giving him leave to fly or a (B) license giving him leave to carry passengers "for hire or reward."

To get a license a man has to pass a medical examination and a flying test. If his health and his eye-sight and his mental state are judged to be good enough, and if he shows sufficient skill he is given the (B) license but if he has some physical defect, such as only one eye or bad hearing or some chronic ailment, or if he is a clumsy flier he is only given an (A) license. That is to say he is allowed to go and risk killing himself or any friend who may be foolish enough to go joy-riding with him, but he is not allowed to take a paid job or to endanger the lives of paying passengers. Which seems perfectly right and proper.

Moreover, a pilot holding a (B) license is only allowed to fly the type of aircraft named on his license. This prevents a pilot who is only used to light slow ships taking a risk by flying a big heavily-loaded passenger ship. If he wants to fly a bigger or faster craft he has to do a demonstration on an empty ship of that type before an examining officer, and if he performs satisfactorily that type is put on his license.

And once in every six months he has to go before an Air Ministry medical board and be examined to see whether his body and mind remain sufficiently healthy to make him a safe pilot.—It says much for the medical boards that in many cases where they have turned a man down for a (B) license and he has taken an (A) license instead, he has crashed soon afterwards.

Every civilian aircraft which is flown outside a radius of three miles from an aerodrome has to have a Certificate of Airworthiness, (commonly known as a C. of A.). Its type, general design and construction must be approved by the technical officials of the Department of Civil Aviation and before it is granted its C. of A. it is inspected to see that it is in an airworthy condition. It also has allocated to it a registered lettering so that it can be easily identified.

After it has got its certificate and is put into regular use it has to be inspected every time it is used, so as to assure that it is constantly maintained in an airworthy state. This inspection has to be made by a licensed Ground Engineer, who has to sign the machine's log-book after each inspection.

According to the letter of the law the log-book should be signed after each flight, but as this would be impossible in the case of a machine taking up passengers at intervals of five minutes (some of our gipsy fliers—or "joy-ride pilots"—have taken up 200 passengers in one day) it generally amounts to an inspection at the end of the day's work or before beginning work, and a signature that the ship is fit for the next day's flying.

What a Ground Engineer Is and Does

The ground engineer must not be the pilot of the ship. The Authorities judge that a man who owns and flies his own aircraft might take a risk and sign a ship as airworthy, knowing that something was wrong and hoping that it would last out another day, whereas if he had to sign for another man to fly the ship, he would not take the chance of a breakage and having to account for his signature after the other man was dead. (As an example one may quote the instance of a pilot who knows that a control cable is showing signs of wear and hopes that it will last out the day, so as not to lose time and money while repairing it on a fine day when paying passengers are waiting to fly).

To get a license as a ground engineer a man has to pass an examination, partly paper, partly verbal, and partly practical by officials of the Department of Civil Aviation. The examination covers the particular type of ship and motor on which he proposes to operate, either as an inspector or as a mechanic—for many men working as mechanics take engineers' licenses to hold as evidence of their skill and experience when applying for jobs.

As a rule the ground engineer of a joy-ride outfit is the chief mechanic but in some cases where there are two pilots each holds an engineer's license and each signs for the airworthiness of the other's ship. In the big air line firms the ground engineer is simply an inspector and does no other work.

An experienced ground engineer will have the names of a number of different types of aircraft and engines on his license. The greater the number the greater his value and the better his chance of a well paid job. But a man who is a specialist on one type of plane or motor and carries only that one type on his license may in fact be worth more to an employee who uses only that one type.

Purpose of Regulations

Now all these rules and regulations mean that so far as is humanly possible the Air Ministry assures that every pilot is fit to fly his ship, every ship is fit to fly, and every man who says that a ship is fit to fly is fit to say so.

The result is that in Europe, British civilian aircraft and their crews are regarded as the safest in the World, just as shipping firms and ocean travellers regard ships holding the

"A.1. at Lloyd's" certificate as being the safest in the World. And already firms will pay more for transport of valuable goods on the British cross-Channel air lines than they will on the foreign lines, just as shippers will pay higher rates for cargo space in British ships.

The objection of American operators of aircraft to the institution of similar rules and regulations in America seems to be that if they were put into operation a horde of Gov ernment officials would immediately swoop down and put all the gipsy flyers out of business on the spot.

Now this objection means either one of two things. Either the objectors know that the gipsy flyers' ships are not airworthy and ought not to be in operation, or else the objectors fear that the inspectors will be either incompetent or out for graft so that licenses will only be obtainable by heavy payment.

The Value of Airworthiness

What the better class gipsy flyer thinks about it may be judged from one ship which was in Hell's Half Acre at Dayton and has painted on its sides the numbers and dates of three certificates which the pilot owner operator holds as a pilot and engineer. They are there to convince prospective passengers that he is competent to fly the ship and to keep it airworthy. That man has a good business judgment.

Some of the civilian operators of aircraft seem to think that the Winslow Bill and the mild agitation in favor of air legislation is a plot by the big manufacturers of aircraft to squeeze out the gipsy fliers and the small firms who provide them with aircraft material so that the big firms may themselves become operators of air lines and of air taxi and joy-ride concerns.

They fear that all the old existing "Jennys" and converted Thomas-Morses and so forth will be condemned at once as not being airworthy on account of aged material or of antiquated design. Such scrapping could not occur, for all those old ships are built of material and of designs which were approved as airworthy by the Army or Navy during the War.

Safety First

In England all our joy-ride concerns operate with war-time Avros altered to take two or three passengers in addition to the pilot. All the owners have had to do is to show the Air Ministry inspectors that the alterations have been made in a way which does not weaken the structure of the machine. And judging from many of the rebuilt or altered ships at Dayton there would be no trouble about convincing Government inspectors that such craft have been improved by being altered or rebuilt.

The statistics issued by the Manufacturers Aircraft Association show that by far the greatest number of fatal flying accidents have occurred to gipsy fliers and their passengers. Yet their total mileage is small compared with the mileage covered by Army, Navy and Post Office pilots. The reason is obviously that the accidents happen to pilots and machines which are not airworthy.

Such accidents spoil the business for the better class builders and operators of civilian aircraft, because they scare people off flying. Proper licenses and certificates of airworthiness would do much to restore and extend public confidence in flying. And such licenses and certificates can only be issued under a proper system of Federal Legislation.

Bristol Jupiter Passes 150 Hr. Tests

Some months ago, the 400 hp. Bristol Jupiter radial air-cooled engine completed an official endurance test of 150 hr. running at 90 per cent full power (including a run of 50 hr. non-stop). Since that time a series of notable performances, both on the bench and in the air, have maintained the Jupiter engine in the forefront, and reports of two successful 150 hr. tests supply the latest proof. The first of these tests was called for by the French War and Marine Departments, and from production engines awaiting test the government inspectors selected an engine at random. The engine was strictly a production series type and no modification or replacement of parts was permitted.

Under the conditions laid down, the 150 hr. test had to be completed in four stages, with a strip and examination between each. A time limit of 18 hr. was laid down for stripping, examination and rebuilding. The 18 hr. started immediately the engine was touched to begin a strip, and the engine had to be rebuilt and sealed ready for test by the close of the 18th hour. The testing, stripping, examination, and rebuilding were officially controled throughout the test. The test was carried out at 90 per cent full throttle, the power being absorbed by a propeller officially calibrated before the test and between each stage. The fuel used was Aviation gasoline of 0.690 specific gravity and the oil was Castrol 'R'. The test was run during the warm weather, the lowest air temperature being 170 deg. C and no additional cooling was provided.

The 150 hr. was done in non-stop runs of 10 and 20 hr. with one non-stop run of 40 hr. Between the stages two full throttle one-hour runs at normal r.p.m., and one full throttle ½ hr. run at maximum r.p.m. were made. The test was concluded by a power curve, the engine developing 400 b.hp. at 1600 r.p.m. and 435 b.hp. at 1750 r.p.m. The engine was finally stripped and a detailed examination made for condition and wear.

For information purposes a ball thrust of different proprietary make was used for each 50 hr. period. Apart from this the only replacements made on the engine during the whole run were two outer valve springs, ten rocker adjusting screws, and sixteen piston rings which were damaged in the various strippings. During the whole run there was not a single involuntary stop and the engine ran with remarkable regularity, maintenance of power and absence of vibration throughout the test. In no case was the allowed time of 18 hr. for stripping, examination and rebuilding exceeded, the actual times being:—15½ hr., 15 hr. and 12 hr.

In order to further demonstrate the qualities of the Jupiter engine and its special suitability for Civil Aviation a series of trials under the most searching conditions, totalling 150 hr. flying, have recently been completed by the Imperial Airways of London. The engine was fitted in the Bristol Freight Carrier which, when loaded, totalled to 6200 lb. in weight, so that it was necessary to cruise at over 90 per cent full throttle. By the installation scheme adopted the cylinder and crankcase temperatures were also higher than under normal test-bed or flight conditions.

The engine used was a standard production Series IV Jupiter engine, No. 922. The usual 3 hr. official bench test was carried out and after installation in the machine 17 hr. flying was carried out in aircraft test flights, full-throttle climbs to try out the cooling, certificate of airworthiness tests, etc. On July 19, 1924, the machine was taken over by Imperial Airways Ltd. for operation as a freighter.

Flights were made on twenty-one days, the longest daily period being 9½ hr. Over this period the average consumptions were 24.8 gal. per hour of gasoline and 1.1 gal. per hour of oil, the average engine speed being 1580 r.p.m. After the engine had run 144 hr. a forced landing was made near Cologne owing to failure of the oil supply following a fracture of the oil pipe to the pressure gage.

The total replacements to the engine on service were two outer exhaust valve springs and a stub exhaust pipe. With regard to installation there was the above-mentioned fracture of the oil pipe to the pressure gage, while the oil pipe from the scavenge pump was found to be broken at the brazed joint.

After removal from the machine the engine was completely stripped for examination in the workshops of Imperial Airways Ltd. As emphasizing the simplicity of the Jupiter and care of dismantling it should be mentioned that the complete strip was completed by three mechanics in three hours, a total of nine man hours, and rebuilt in 19 hr. Several piston rings were accidently broken in removal through lack of proper tackle, and the only other replacements were three inlet rocker buttons and a connecting rod complete with white metal bush. Though the bush was still serviceable the opportunity was taken for its replacement as cracks in the white metal were detected. The general condition of the engine was excellent, the bearings and working parts showing a minimum of wear.

Light Plane Progress and the Engine Question

By GLENN D. ANGLE

One has only to review the impressions of the Air Races appearing in recent columns of AVIATION to appreciate the severe handicap suffered by the light plane entries in not employing suitable engines. This situation might have been avoided and is therefore to be much regretted; yet, as in most errors of this nature, there is always something gained in the form of experience. It has at least proved that motorcycle engines are quite unsatisfactory when adopted to such use, and confirms a private opinion entertained ever since the enthusiasm over light planes began.

Unfortunately the right sort of engines were not available in this country at reasonable prices, so the question naturally follows as to why some manufacturer has not designed an engine especially for light plane use, and then built it in sufficient numbers to permit a unit price within the reach of the average user. Although there are perfectly obvious reasons why this has not been done, some brief remarks in this connection at the present moment will certainly not be amiss.

Power Requirements

In the first place, let us investigate the power requirements of light planes, assuming that any ship using 50 hp. or less must be listed in this category. Outputs from 10 to 50 hp. do not represent a very wide range as the power requirements of aircraft in general go, yet if we attempt to become too liberal within this range it amounts to the same thing as grouping into one class all aircraft engines developing between 100 and 500 hp. Granting that it is perhaps a bit unfair to magnify these figures ten times, it nevertheless serves to illustrate an important point upon which there is apparently little agreement or certainty at present.

What, it may be asked then, are the required power outputs—or the cubic inch displacements, should it be preferred to use the latter method of classification—for the light ships that are likely to become most popular? Here is a question that must be satisfactorily answered before any sane manufacturer will spend good time and money on engine developments of this kind.

We find one group of airplane designers that think and speak mostly of outputs from 10 to 20 hp. This is apparently enough power for flying during fair weather, but it cannot be regarded seriously except as a sporting proposition. It is consequently even more important to know the probable demand before a manufacturer can see the feasibility of marketing such a tiny engine. Moreover, neglecting for the moment the possible aerodynamic information obtained thereby, is there not a chance that such low-powered planes are only a fad, here today and gone tomorrow, as in the case of the cyclecars of some ten years ago?

Engine Builders in a Quandary

On the other hand, there are some who feel quite certain of commercial possibilities, in addition to sport and pleasure use, for small planes employing engines developing around 40 hp. Others seem to want or need less power, while there are some who insist upon more power—even to the point where they are no longer restricting themselves to the light plane class.

In the face of these diverse opinions, the engine manufacturer who might be keenly interested in this field is certainly left in pretty much of a quandary. It therefore seems of prime importance for the airplane designers to arrive at some common understanding, either through discussion or by the acceptance of specifications drawn up by a well-informed committee appointed for the purpose. Such specifications should naturally cover as few types as possible, and include such items as horsepower or piston displacement, maximum and minimum propeller speeds for best efficiency, desirable or maximum allowable weight, and perhaps later even overall and mounting dimensions. These specifications would, of course, be subject to minor revisions as the requirements became more thoroughly understood and appreciated, yet for the present they would at least guide the efforts of the engine manufacturer and thereby eliminate a great deal of unnecessary lost motion.

It is further believed that these specifications should be drawn up irrespective of the European light plane developments, since the primary object is to arrive at something commercially possible as well as something having commercial possibilities. It is not proposed to suggest anything further along this line, it being considered sufficient for the present to merely direct attention to the apparent lack of unity of thought and purpose.

Now let us suppose for example that we have universally adopted specifications for each type or class of light plane engine, there remains still another and even bigger problem before any of these engines can be placed on the market at reasonable prices. That problem is to ascertain the quantity of each type the aircraft manufacturers and private constructors will buy. From all appearances the market is good, yet the writer has no knowledge of any one launching out on a manufacturing program large enough to make the production of these engines worth while. This question of the market is entirely up to the plane builder, as he is closer to the thing and naturally in the best position to know its possibilities.

Enthusiasm vs. Business Sense

From all sides one hears countless enthusiastic expressions of the light plane field, and these are usually contingent upon the procurement of suitable engines at reasonable prices. No manufacturer should be expected to give away engines to get this business started, and yet that is practically what it would amount to if a limited number of engines were built and sold for a price such as could be possible only on a fairly large production basis. There has to be a considerable outlay of money for patterns, tools, etc., which must be absorbed some time. It is only natural for the manufacturer to not try to spread this expense over a greater number of engines than he is certain to build and sell. Hence, if no one in the airplane business is sufficiently sure of this thing to guarantee a market for a certain number of engines, how can they expect to buy these special engines at the prices being asked for motorcycle engines which are already in production in large quantities.

It is an unfortunate state of affairs that so few people really appreciate the expense of developing and producing an engine, and especially since the engine invariably constitutes the major portion of the expense. It therefore seems that greater progress would result by first giving this matter some attention.

These statements are not made with an idea of criticizing any one in particular: they merely represent facts of vital importance to an industry which it is hoped will actually exist before very long. Let us therefore take some steps to intelligently standardize on the types or sizes of engines required, and then perhaps some manufacturer may see his way clear to place one or more of these units on the market.

Yawing Moment and Rolling Moment

N.A.C.A. Report No. 197

In this paper by Max M. Munk, prepared for the National Advisory Committee for Aeronautics, the induced yawing moment, due to the rolling moment produced by the ailerons, is computed. This induced yawing moment is the greatest part of the entire yawing moment encountered by the wings. The following approximate formula results: Induced yawing moment/Rolling moment is about Lift coefficient/Aspect ratio.

Report No. 197 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

New British Rigid Airship

Sir Trevor Dawson, Vice Chairman of Vickers & Co., announced on Nov. 5 that his company had signed a contract for the construction of an airship of 5,000,000 cu. ft.

This will be more than twice the size of the ZR3.

The new airship is the first of two such vessels which are to be built under a recent Government decision to redevelop airships in Great Britain. The contract is one which was offered to the Burney airship group for construction of an airship to fly from England to Egypt and India.

When he said the contract had been awarded, Sir Trevor was speaking as Chairman of the Airship Guarantee Co., an associated company of Vickers, and not as Vice Chairman of the Vickers firm, though a large number of component parts of the structure will be made by that firm.

Approximately, the cost to the Government for the first airship will be £350,000, provided the airship completes its trials. Three years are allowed for the construction, and under the contract it must be delivered to the Air Ministry by September, 1927. Its length is 695 ft. and its diameter at the point of greatest girth is 132 ft. The contract specifies that the structure and other fixed weights must not exceed ninety tons.

Budgeting on a range of 2,500 mi., there is available as space for a paying load weight of 120 passengers and ten tons of freight or mails. This figure is arrived at after allowing a 50 per cent reserve for fuel and oil.

Thirty two-berth cabins are provided along the sides of the vessel, and in addition there is a smoking room, a lounge big enough to dance in, the usual accommodation for kitchens and the quarters for a crew of forty.

The passenger quarters are completely isolated from the rest of the ship, not only by gas-tight walls, but by an air space through which free air will constantly be circulating, so that the fire risk from a passenger's carelessness or ignorance is reduced to a minimum. Hydrogen is to be the lifting medium, but gasoline will be eliminated in favor of the Ricardo kerosene and hydrogen fuel system. So far, the system only has been experimented with on small engines, but a full size power unit of 550 hp. is nearing completion and will be tried out shortly. Seven of these units are to be used in the airships, giving a total energy of 3,800 hp., for an expenditure of little more than a half ton of fuel in an hour.

A cruising speed of 70 mi./hr. is estimated, and the reason for basing the financial calculations on a range of 2,500 mi. is that this distance is approximately that of four stages between here and Australia. It is hoped to bring India within four days' journey of the British Isles.

New Pioneer Fuel Gage

The Pioneer Instrument Co. of Brooklyn, N. Y., has placed upon the market a new type of fuel gage employing the hydrostatic principle. It is claimed that the new gage is free from the objectionable features which have been inherent in many previous types of liquid level gages.

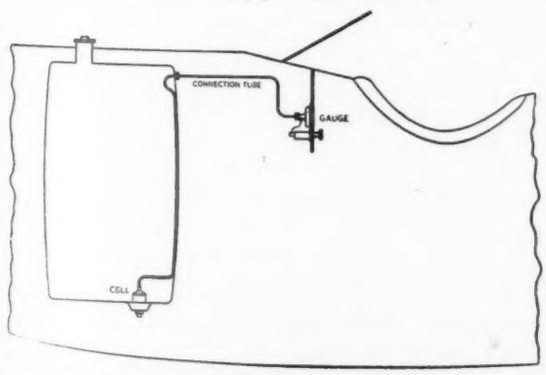
The new Pioneer Fuel Gage

A typical installation is illustrated in the accompanying drawing. Mounted in the fuel tank is a "hydrostatic cell" from which a tube is brought to a threaded fitting on the outside of the tank. On old tanks which have openings for the installation of any of the old types of gages or gage-floats, the hydrostatic cell may be suspended in the tank from such an opening. The gage may be located at any distance from the tank and is usually mounted on the instrument board. A small connecting tube completes the installation.

The gage illustrated is one of those used on the Vought UO1. This plane has two tanks, one of which forms part of the streamline on each side of the fuselage. Both tanks are fitted with hydrostatic cells and two gages are mounted on the instrument board. In the Vought installation the gages are graduated in single gallons, and the pilot can see at all times the exact amount of fuel in each tank.

Built as a unit with the gage is a small hand-operated pump. The functioning of the gage depends upon the pressure of the air in the connecting tube and this, in turn, depends upon the height of the fuel in the tank. Without some means for replenishing the air supply in the tube, however, the gage would be subject to certain small errors due to changes in temperature and atmospheric pressure which would cause slight losses of air. The pump is therefore provided. Once a day, or whenever it is desired to know the fuel level with great accuracy, the pump plunger is pulled out and released. This restores the balance of the system and assures an accurate indication. It is not necessary to pull the pump every time the gage is read. The hand indicates the fuel level continuously except for the slight errors mentioned above.

The new Pioneer gage is supplied for all heights of tank. Each gage is graduated at the factory for the tank with which it is to be used if sufficient data is available. Otherwise the gage is shipped with a blank dial, to be graduated after installation.



Installation diagram of the new Pioneer Fuel Gage

New American Records Authenticated

The following new airplane altitude and duration records with useful load have been recognized by the Contest Committee of the N.A.A.:

CLASS C—AIRPLANES

With useful load of 1500 Kg. (3306.93 lb.)

Altitude

Lieut. J. A. Macready, U.S.A.S., Curtiss (Martin) Bomber, NBS1, 2 Liberty 400 hp., at Wilbur Wright Field, Dayton Ohio, Oct. 2, 1924—4953 m. 16,250 ft.

Duration

*Lieut. J. A. Macready, U.S.A.S., Curtiss (Martin) Bomber, NBS1, 2 Liberty 400 hp., at Wilbur Wright Field, Dayton, Ohio, Oct. 2, 1924—2 hr. 13 min. 49.6 sec.

*In accordance with Art 198, F.A.I. Regulations ("A record established by an aircraft carrying a certain useful load is broken in its category, when an aircraft carrying an equal or greater load, makes a performance showing better results for distance, duration, speed or altitude, according to the nature of the record") this is also a record for category with useful load of 1000 kg. (2204.62 lb.).

With useful load of 4000 Kg. (8818.48 lb.)

Altitude

Lieut. H. R. Harris, U.S.A.S., and Mechanician Doug. Culver, Barling Bomber, 6 Liberty, 400 hp. at Wilbur Wright Field, Dayton, Ohio, Oct. 3, 1924—1363 m. 4472 ft.

Duration

†Lieut. H. R. Harris, U.S.A.S., and Mechanician Doug. Culver, Barling Bomber, 6 Liberty, 400 hp., at Wilbur Wright Field, Dayton, Ohio, Oct. 3, 1924—1 hr. 47 min. 10.5 sec.

†In accordance with Art. 198, F.A.I. Regulations this is also a record for categories with 1500, 2000 and 3000 kg.

The following new American seaplane records recently established at Baltimore Md., have been recognized by the Contest Committee of the N.A.A.:

CLASS C?—SEAPLANES

Speed Records

Maximum Speed

Lieut. George Cuddihy, U.S.N., Curtiss Navy CR Seaplane, Curtiss D12, 450 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—302.68 km./hr. 188.08 mi./hr.

Speed for 100 Kilometers

Lieut. R. A. Ofstie, U.S.N., Curtiss Navy CR seaplane, Curtiss D12, 450 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—286.86 km./hr. 178.25 mi./hr.

Speed for 200 Kilometers

Lieut. R. A. Ofstie, U.S.N., Curtiss Navy CR seaplane, Curtiss D12, 450 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—286.86 km./hr. 178.25 mi./hr.

Speed for 500 Kilometers

Lieut. R. A. Ofstie, U.S.N., Curtiss Navy CR seaplane, Curtiss D12, 450 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—259.33 km./hr. 161.14 mi./hr.

With useful load of 1000 Kg. (2204.62 lb.)

Duration

Lieut. Geo. R. Henderson, U.S.N., PN71, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—5 hr. 28 min. 43 sec.

Distance

Lieut. Geo. R. Henderson, U.S.N., PN71, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—400 km. 248.55 mi.

Speed for 100 Kilometers

‡Lieut. Geo. R. Henderson, U.S.N., PN71, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—126.345 km./hr. 78.507 mi./hr.

Speed for 200 Kilometers

‡Lieut. Geo. R. Henderson, U.S.N., PN71, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—126.345 km./hr. 78.507 mi./hr.

‡In accordance with Art. 198, F.A.I. Regulations, this is also a record for the categories with useful load of 500 kg. (1102.31 lb.) and 250 kg. (551.15 lb.).

With useful load of 2000 Kg. (4409.24 lb.)

Duration

Lieut. O. B. Hardison, U.S.N., PN72, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—1 hr. 49 min. 11.9 sec.

Distance

§Lieut. O. B. Hardison, U.S.N., PN72, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—100 km. 62.137 mi.

Speed for 100 Kilometers

§Lieut. O. B. Hardison, U.S.N., PN72, flying boat, 2 Wright T2, 535 hp., at Bay Shore, Baltimore, Md., Oct. 25, 1924—110.08 km./hr. 68.4 mi./hr.

§In accordance with Art. 198, F.A.I. Regulations, this is also a record for the category with useful load of 1500 kg. (3306.93 lb.).

As these records exceed the present world records for the respective categories, the official reports will be forwarded to the Fédération Aeronautique Internationale for official recognition as world records.

It is worth noting that counting the above records, the U. S. Navy has won twenty-three out of twenty-eight world records for seaplanes. The five records not held by the Navy are seaplane altitude records held by France.

What is Proper Lateral Control?

Editor, AVIATION:—

I would like to make a suggestion for discussion in AVIATION on a point in the theory of flying over which there were many heated arguments among instructors during the war. The question is "What is the proper control to correct sideways balance?"

Each of the three groups argued respectively: opposite aileron; opposite rudder; combination of opposite stick and opposite rudder. Each group claimed the other two systems were wrong, but all three systems are correct, each one under the three conditions a ship may be in with, say the left wing down. You are either in a left skid, a right skid, or pointed in the line of flight (no skid).

1. To correct left wing low, in left skid, apply only right stick. The left aileron, being lowered, raises that wing and at the same time creates a greater drag on the left wing, thereby turning the ship into the skid.

2. To correct left wing low, in right skid, apply only right rudder. In this case, turning the ship to the right makes the left wing go faster than the right thereby lifting the left wing to normal. The right rudder also turns the ship into the path of flight and corrects the skid.

3. To correct left wing low, when the ship is not skidding, apply a combination of right stick and right rudder. The right stick brings the wing up and the right rudder counteracts the swerving tendency to the left caused by the drooped left aileron.

It will be noticed that in each of these three cases, after applying the correction, the ship becomes laterally level and is pointed into the line of flight.

CLOYD CLEVENGER
St. Louis, Mo.

Aeronautical Nomenclature

Arthur Halsted, assistant secretary of the Sectional Committee for the Aeronautical Safety Code, has made an interesting suggestion with regard to a standard aeronautical nomenclature in a letter sent to Dr. Joseph S. Ames, chairman of the Conference on Aeronautical Nomenclature, N.A.C.A. Mr. Halsted wrote as follows:

"I am very thoroughly converted to the American Engineering Standards Committee procedure of establishing standards, such as the one about to be considered on Aeronautical Nomenclature. This leads me to suggest that this procedure be considered in connection with the undertaking of the Conference on Aeronautical Nomenclature.

"The American Engineering Standards Committee has recently initiated projects that, in general scope, may overlay the work of the Conference on Nomenclature and it would seem to me most desirable to separate distinctly the scope of the proposed report on Aeronautical Nomenclature from other projects now under consideration. Adherence to A.E.S.C. procedure would serve to avert possible duplication of effort and divergence of national standards."

The Latecoere LAT16 Mail Plane

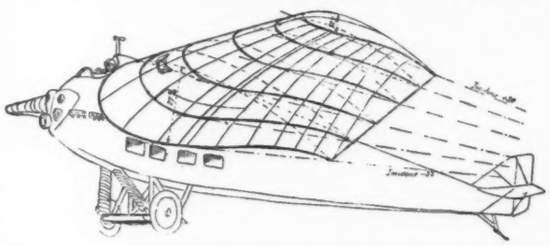
One of the most successful and interesting foreign air lines is that run by the Latécoère Co. from Toulouse, in the South of France, to Casablanca, Morocco. Toulouse was chosen as the starting point so that mail and passengers could travel on the night train from Paris. The line skirts the south eastern coast of Spain, stopping at Barcelona, Alicante and Malaga, and crosses into Africa at Gibraltar. During the summer the 1150 mi. flight is made in one day. This line is a real time saver and judging from the steady increase in business it has an economic basis as well as a political one. During the sole month of August the air line carried 22,582 letters in 1920, 34,283 in 1921, 128,562 in 1922, 228,548 in 1923 and 334,762 letters in 1924.

The experience of the Latécoère air line showed that it needed a machine with the following aerodynamic qualities: greatest possible speed (minimum high speed of 112 mi./hr., maximum landing speed of 56 mi./hr.), roll on landing and take-off 650 ft., and maximum maneuverability.

The pilot's requirements included perfect vision forward, downward, toward the sides and upward to the rear; possibility of letting go of the controls during a prolonged flight; and having the motor near the pilot so that he could hear unusual sounds.

From the point of view of general arrangement it was found desirable to eliminate the fire hazard by removing to the maximum distance the gasoline tanks; to have very large baggage compartments so as to make loading and unloading easy and to be able to handle fragile goods; and finally to have a large and well ventilated passenger cabin.

In trying to come up to this standard the Société Industrielle des Avions Latécoère has built a plane known as the LAT16. This is a thick wing monoplane in which the interior of the wing roots are used as a receptacle for baggage and



Schematic drawing of the LAT16 mail and passenger plane of the Latecoere Co.

for the gasoline tanks. The fuselage is entirely reserved for the passengers. The pilot is placed directly above the motor with his head on a level with the leading edge.

All possible parasite resistance has been eliminated. Beside the baggage compartment and the gasoline tanks, which can be dropped in flight, the wing contains a generator, batteries, landing lights (one of them movable), a Hermann-Auclair fire extinguisher and the oil reservoir.

Much importance was attached to the study of the wing. This varies from the roots to the tips in thickness from 27 per cent to 12 per cent; in incidence from —3 deg. to +3 deg.; and in chord from 13 ft. 8 in. to 6 ft. 10 in. The wing section is a combination of Göttingen 430 and 435.

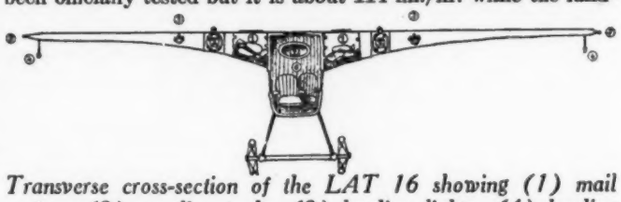
All the frame work of the plane is made of metal, except the wing ribs. Tubing is used wherever possible, for the longerons, for cross bracing and for the fuselage and wing mountings. The mail compartments are aluminum coffers. The passenger cabin is also metallic. The wings and the rear of the fuselage are cloth covered.

The longerons are U members as are the cross members. The ailerons are 14 ft. 5 in. long, unbalanced and controlled by cables. The elevator is balanced, but the rudder is not. The landing gear is fitted with 1000 x 180 wheels, and has a tread of 6 ft. 6 in. The tail skid is of metal and fitted with a spring.

The 400 hp. Lorraine motor is cooled by two Lamblin strut type radiators placed on the forward side of the landing struts.

Following are the characteristics of the LAT16: Span 59 ft. 3 in. Length 42 ft. 11 in. Height 11 ft. 5 in. Wing area 520 sq. ft. Maximum chord of wing 13 ft. 8 in.; chord at tip 6 ft. 10 in. Weight of the wing cell with covering 1166 lb. Weight of plane light 3850 lb. Useful load 1,650 lb. Wing loading 10.4 lb./sq. ft. Power loading 13.75 lb./hp.

Carrying a weight of 836 lb. of gasoline, 70 lb. of oil, 176 lb. of miscellaneous parts, 176 lb. of crew and 770 lb. of cargo, the LAT16 took off in 468 ft., rolled on landing 429 ft. and had a ceiling of 14,190 ft. The high speed has not been officially tested but it is about 114 mi./hr. while the landing speed is less than 56 mi./hr. The climbing test was made with a 400 hp. Lorraine engine, turning at 1520 r.p.m. instead of the regular 1700 r.p.m.



Transverse cross-section of the LAT 16 showing (1) mail coffers, (2) gasoline tanks, (3) landing lights, (4) landing flares, (5) position lights, (6) passenger cabin with staggered seats

Fitted with the 300 hp. Renault engine the machine on a run from Toulouse to Casablanca made as good time as a Breguet 14 (fitted with the same motor) while carrying 570 lb. more load. This machine has been in operation for about a year.

Dual Ignition for Aircraft Engines

Dual ignition for aircraft engines of over 100 hp. is required by the section on power plants of the American Aeronautical Safety Code. Two or more spark plugs per cylinder and at least two sources of primary current should be provided, according to the code, and each source should be capable of operating the engine. Pressure lubrication and self starters are recommended, while all motors of more than 200 hp. are required to have some means of starting other than by turning the propeller by hand.

The code, which is being prepared under the auspices of the Bureau of Standards and the Society of Automotive Engineers, is based in this part on an internal combustion engine similar to those now in general use. New types of engines are required to undergo a type test before acceptance, this test including measurements of power output from 20 per cent below normal speed to 5 per cent above, and a 50 hr. durability run.

All engine controls are required to be made standard in the direction they move to perform their functions. Thus the throttle must move forward to open, the mixture control forward to make lean, etc. The cowling covering the engine and the engine itself must be so arranged that parts which wear out rapidly or give frequent trouble may be easily reached when the plane is on the ground and may be gotten at without dismantling other parts.

Safety provisions for gasoline, oil, and water piping, tanks, and radiators are given, and it is required that all liquid receptacals must be capable of being drained with the plane in normal position on the ground, and without any of the liquid falling on parts of the plane. The air intake must be made of fireproof material and must extend outside the fuselage. Exhaust pipes must be carried clear of all inflammable parts, and must discharge in such a way that the gases cannot blow in the faces of the occupants. Details of wiring, piping, etc., and requirements as to propellers are included.

Copies of this section of the code are available at the Bureau of Standards and may be obtained by anyone who is interested in the use or development of aircraft. The code is tentative as yet, not having been finally adopted by the full committee. Experts in the government service, representatives of aircraft manufacturers and users, and all others whose opinions were considered valuable have been consulted in its preparation.

LIGHT PLANES AND GLIDERS

Edited by Edmund T. Allen

Tribulations of Light Plane Builders

How official Regulations may hamper light airplane development is shown by the fact that the DeHaviland Co. of England recently announced an increase in price necessitated by the stringent requirements which must be met to obtain a British airworthiness certificate for the DeH53 light monoplane.

The company had originally planned to utilize special constructional methods and certain modifications of design in an effort to produce a light plane at the minimum price. However, as the Air Ministry standards have not been modified to allow for types of power plant which would not satisfy the demands of larger type airplanes, but are perfectly permissible in lighter craft, this ambitious project has been seriously hampered.

The substitution of a Blackburne "Tomtit" engine in place of the motorcycle type of the same make has alone increased the constructional cost some 137 per cent.

The performance and characteristics of the DH53, as demonstrated by trials, are as follows:

SPECIFICATIONS OF THE DH53 LIGHT PLANE

Weight (full tanks), less pilot	342 lb.
Gasoline capacity	2 gal.
Gasoline consumption (cruising)	6½ pt./hr.
Cruising speed	60 mi./hr.
Full speed at ground level	73 mi./hr.
Full speed at 2,000 m.	68 mi./hr.
Rate of climb at ground level	370 ft./min.
Air speed on climb	42 mi./hr.
Climb to 3047.9 m.	45 min.
Ceiling	15,000 ft.
Get-Off (in calm air)	105 yd.
Landing speed	33 mi./hr.

Regarding the Morehouse Engine

In the Aug. 11 issue of AVIATION it was stated that the builders of the Morehouse engine had failed to cooperate with those who wished to obtain these engines for light planes. This was not intended in any way to reflect upon Harold E. Morehouse, who designed the wonderful little 42 cu. in. engine which was tested last year at the McCook Field engine laboratory. Mr. Morehouse has, in fact, devoted a great deal of effort to further the development of the light plane. He produced in the little "42" the finest motor of its size that has appeared in this country, if not in the entire industry, and was interested in putting this power plant into the hands of light plane builders and developing a market for it in large quantities and at a price that would not be prohibitive to the small builder. Circumstances, however, entirely out of his control, intervened and made delivery at this point impossible.

An announcement will appear shortly in these columns dealing with a new design of Mr. Morehouse, which will be built and available soon to those who are now looking for a light plane engine. At present we will only state that this new Morehouse product will be of 80 cu. in. displacement and will develop 25 hp. at moderate speed.

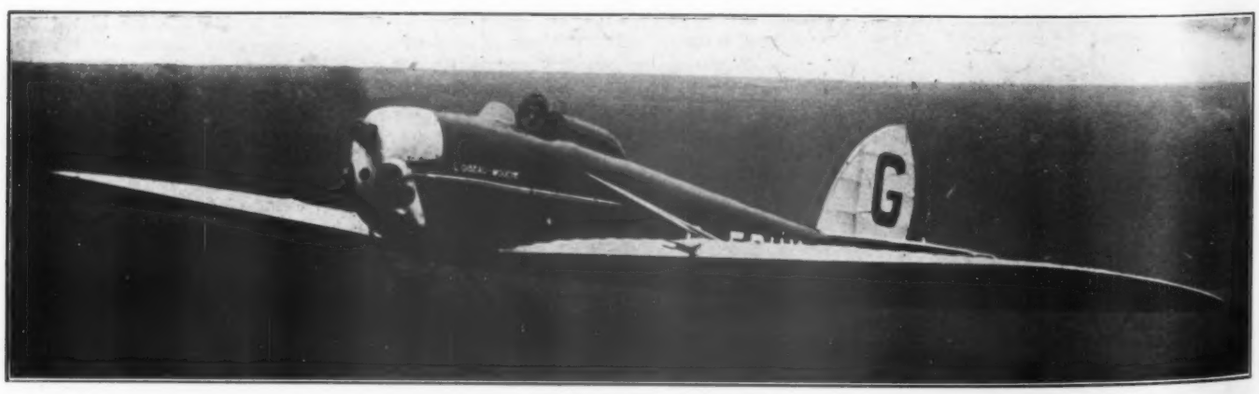
The Dormoy light plane on which its designer, E. Dormoy, won the Rickenbacker Trophy race

Light Planes for Air Force Training

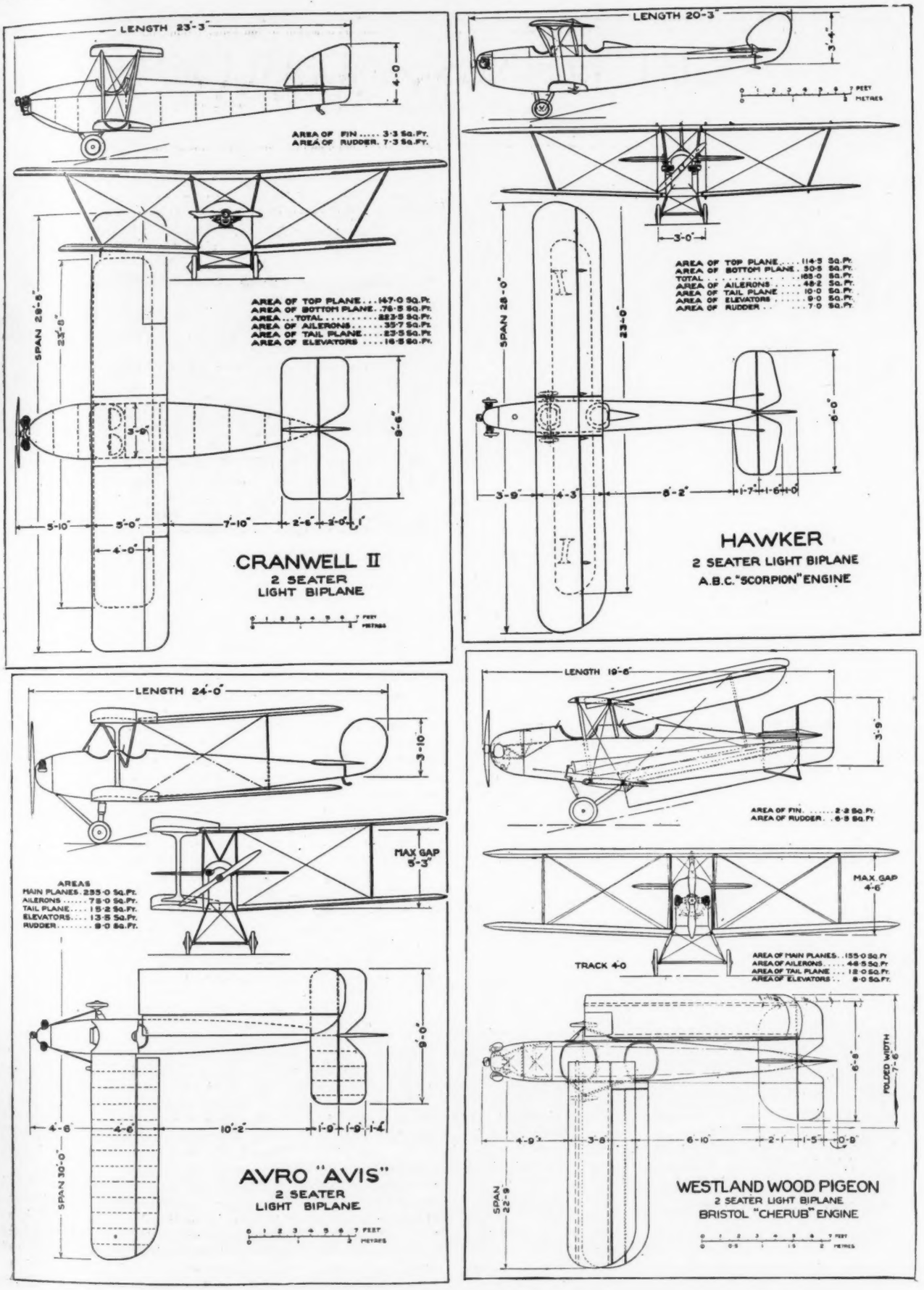
The Dutch Naval Air Service recently faced the problem of maintaining its service, and keeping its pilots in training with a very greatly reduced appropriation. On account of the limitation of the budget, pilots are limited to five hours flying per month. It was found that for the same expenditure that flying can be carried out every day of the month on light planes together with two hours flying per month on service aircraft.

Tests have been carried out at Helder Air Station with light planes of the Holland type built by Mr. Carley and fitted with Anzani engines and very favorable results have been obtained.

Specifications of the Holland light planes were published in the June 30, 1924, issue of AVIATION. This little ship has since made some extensive cross country flights.



DH53 light plane, as originally equipped with a Douglas 700 cu. cm. motor cycle engine. The power plant now used is a Blackburne Tomtit engine of 1,100 cu. cm. capacity



Courtesy *Flight* (London)

AIRPORTS AND AIRWAYS

San Francisco News

By Walton Gilbert

The Marina Civilian Flying Field is doomed. For years real estate subdividers have cast eyes of longing upon this neat little plain that snuggles close within the Golden Gate, and not more than fifteen or twenty minutes drive from San Francisco's business district. Today model homes and scenic roadways are excommunicating the City by placing it without the pale of efficient aerial transportation. There seems to be no other strategic location for an airport near the City. True there are several possible cities in the Bay Region, notably in Alameda, Richmond, and South San Francisco. But these locations may hardly be said to solve the economics of air travel, which demand above all a quick approach to the downtown district without resort to boat trains, ferries, cable cars—and other such relics of the slow freight era—between flight terminus and destination.

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The enthusiasm of San Francisco for aviation has been displayed chiefly in its support of the Air Mail, and in the popular interest of its citizenry in the development of local defence by the Air Service. It is, however, greatly to be hoped that the civic authorities and business men with their usual acumen for civic development, will not neglect NOW to review the flying facilities of the Cty, and take such common sense steps as the facts may dictate to insure local provision not less inviting to commercial aerial enterprise than the facilities of other representative cities afford.

At the Office of the Weather Bureau the other day, we had the pleasure of discussing with Maj. E. H. Bowie certain peculiarities of the local atmosphere.

The whole Pacific Coast is to a certain degree subject to fog, which rolls in from the ocean being caused by contact of the saturated ocean atmosphere with slightly cooler water lanes along the shore line. The entrance to the Golden Gate forms a natural pathway for the fog laden breezes with the result that when certain areas of the Bay Region are fog ridden—other parts are quite clear. Thus it seems probable, due to the eccentricities of local air currents, that with suitably placed emergency fields San Francisco may be approached with greater confidence in foggy weather than any other Pacific Coast city.

A valuable method of surveying the fog situation along the coast has been suggested by Major Bowie and it is hoped at a future date to submit further matter regarding this phase of western aeronautical development.

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Mr. Balmer, genial sportsman and financier of Southern California, was pleasantly surprised last Tuesday to see his Fisk Plane wing its way into Crissy Field from Santa Monica, bringing Mrs. Balmer and her mother. The ladies were delighted with their experience, and commented upon the greater comfort of air travel as compared with the boat trip.

The Fisk product is a good example of the modern sport plane. Special attention has been paid to stream-lining within practical limits, and the appearance is very clean cut. The front seat accommodates two passengers, and the rear cockpit is fitted with side-by-side dual control. The plane is motored with a Wright-Hispano engine, weighs 1600 lb. fully loaded and has a crusing speed of 95 mi./hr.

The Tuxhorn Sport Plane

The day before the Wichita air meet there appeared in the sky a plane which immediately attracted attention owing to its unusual lines. As the ship came nearer it was seen that it was a rigidly braced monoplane, but nobody seemed to be able to recognize its nature. "A Loening Fighter," suggested someone. "No, a Morane," said another. It was neither. When the ship had landed, its pilot revealed himself as B. M. Tuxhorn of Kansas City and the ship as the Tuxhorn Lark sport plane with a 60 hp. Wright "Gale" (L4) 3 cylinder radial engine. The accompanying illustration shows the general features of this home made ship which proved itself to be a real aerial flivver.

The ship was not very fast, but the way the pilot handled it showed that it was practically fool proof. He would hop off the ground in twenty or thirty feet and then climb at an alarming angle, or do all sorts of incredible maneuvers which sent chills down the spine of experienced airmen. For one thing the ship seemed incapable of stalling. On one occasion Tuxhorn took off right into a line of small flagstaffs that were marking the official starting line. Just when it seemed that it must hit the flags with the wing, the ship rose from the ground at an angle that, as one pilot put it, "no ship should be allowed to fly at." Strong men groaned, expecting a momentary side slip and all that goes with it near the ground. But Tuxhorn went them one better. He put down one wing and nosed the ship over—and the Lark made a funny movement like a chicken jumping down sideways from a fence, gathered speed and sailed away serenely, with the pilot grinning indecently. And then, just to show that he had not exhausted the possibilities of this astounding plane, he throttled down the engine until it sounded like one of those lawn mower engines that are used in public parks, and crawled over the field some twenty feet from the ground.

The Tuxhorn Lark sport plane (60 hp. Wright), with its designer and pilot, B. M. Tuxhorn

Owing to the stress of more important business it was unfortunately impossible for the Editor of AVIATION to secure the characteristics of the Lark, but if Mr. Tuxhorn should happen to read this he is requested to give us more ample information about his remarkable little ship.

Airport in Port of Buenos Aires

A bill has been introduced in the Argentine Congress authorizing the Executive to expend up to two million pesos paper in the construction of an airport to be situated at the northern extremity of the Port of Buenos Aires, Commercial Attache Feely advises the Department of Commerce. The funds would be expended over a period of three years and would be included in the Budgets for 1925, 1926, and 1927, at the rate of one million in the first year and 500,000 in each succeeding year.

Revenues for the operation and maintenance of the airport would be derived from rentals, the granting of pilot's licenses, landing permits, port dues, inspection, etc. The administration of the airport would be under the supervision of the Ministry of War, with the intervention of the Customs and Port Authorities, and would be utilized principally as a landing place for commercial and passenger planes, and for aviation schools.

Napier Lion Passes Severe Tests

The 450 hp. Napier Lion engine recently underwent a series of strenuous endurance tests under the supervision of the aircraft inspection department of the British Air Ministry.

The first series consisted of ten 50 hr. runs, in the course of which the engine turned a total of 534 hr. All tests were passed with flying colors.

The second series of the endurance test was a 104 hr. run. Starting with a power curve, the test included ten periods of ten hours duration each, at 2,000 r.p.m. Ninety-nine of these 100 hr. were run at 420-425 b.hp.; the hundredth hour being run at approximately 470 b.hp. Then followed ten minutes' slow running at 500 r.p.m. The engine was then opened up to 2310 r.p.m. and was run for one hour at this speed, developing approximately 350 b.hp. A further hour at 2200 r.p.m. was run at full throttle; the engine developing approximately 500 b.hp. The final power curve completed the test.

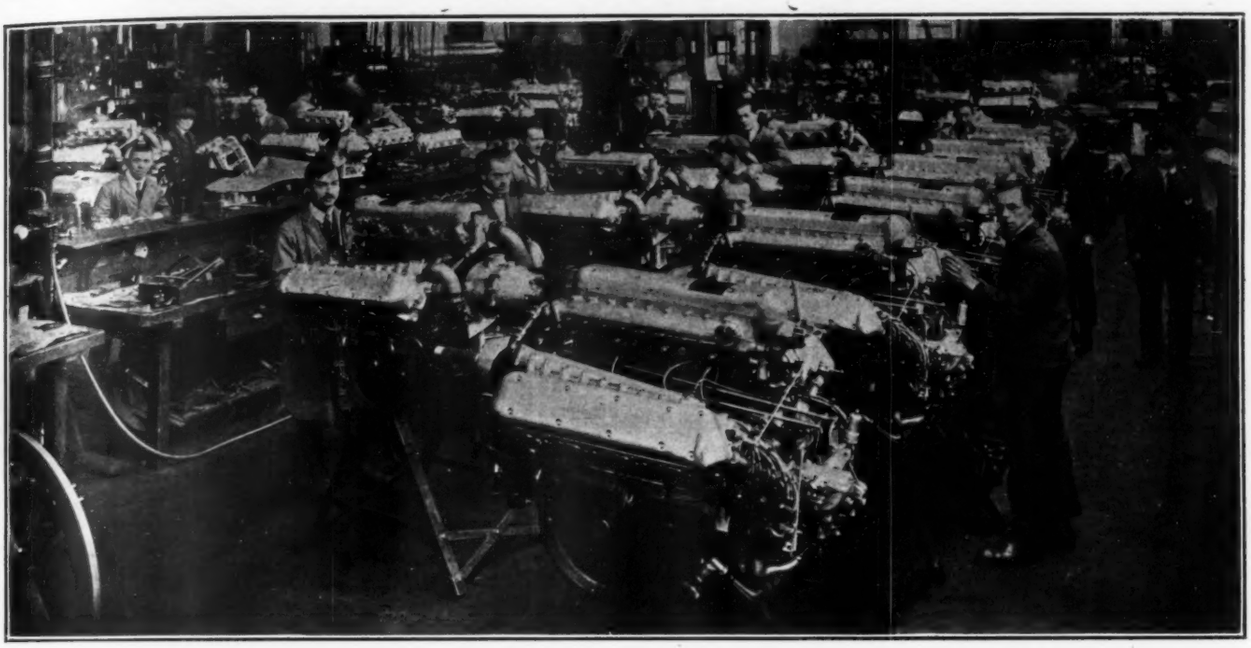
No part of the engine was changed or adjusted during the test.

This wonderful performance achieved by the Napier Lion further emphasizes its extraordinary reliability, flexibility and high performance.

So successful has the 450 hp. Napier Lion aero engine proved, not only in Royal Air Force circles but also for racing and commercial flying, that a large proportion of the Napier factory at Acton, England, is now engaged solely on the construction of aero engines.

The most scrupulous care is employed in the manufacture of these engines. Each engine is built twice over, as after its first bench test it is taken down completely, examined and reassembled for its final test.

The accompanying illustration shows a number of the famous Napier Lion engines nearing completion.



Napier Lion engines nearing completion at the Acton factory of D. Napier & Son, Ltd.

Commercial Aviation in Honduras

In a letter recently received by *Air Service News Letter* from P. H. Hebert, Official Photographer for the United Fruit Co. at Tela, Republic of Honduras, it is noted that the Tela Division of the United Fruit Company now owns and operates an airplane between the principal towns and ports in Honduras. Flights are made to transport mail and passengers, and on official business for the company.

It was through the efforts of R. H. Godell, the Manager of the Tela Division, that this service was established. He is also responsible for having landing fields arranged so that practically every port on the East Coast of Honduras can be reached by airplane. Trips which a month ago required from three to ten days hard traveling can now be made in comfort in as many hours.

The airplane employed is the new Lincoln LS5, seating four passengers and a pilot. The Hispano-Suiza 180 hp. motor is being used. Errold Bahl, formerly an Air Service flying instructor, is pilot. Mr. Bahl made the first successful flight from Tegucigalpa to Tela on the East Coast. This is in itself an accomplishment worthy of note. Over 150 mi. of forbidding territory must be negotiated, above mountains and jungle.

Aerial photographic missions are to be undertaken and chiefly for experimental work a camera is being made by the Tela Division. This camera was designed by P. H. Hebert, official photographer for the company, who was formerly an Air Service photographer. The company hopes to be in a position soon to deliver an aerial map in a few hours which formerly took weeks or even months to obtain.

London-Paris Express Freight Air Service

A regular aerial express freight service between London and Paris was established Sept. 22 by the Imperial Airways Co. (Ltd.). Heretofore freight and express packages have been shipped along with passengers' baggage on the passenger planes.

At present one plane daily operates on this service, but the company expects to increase the number to two planes as soon as possible. The charges, which include collection at one end and delivery at the other, are as follows.

For 1 pound	1s.	6d.
3 pounds	2s.	3d.
7 pounds	3s.	
11 pounds	3s.	10d.
22 pounds	7s.	6d.
33 pounds	11s.	
44 pounds	14s.	6d.
Over 44 pounds	per pound	4d.
Over 1 hundredweight	do	3d.

A similar express freight service has been maintained between London and Cologne ever since the passenger service was inaugurated some five years ago. Its rate for freight started at 7s. 6d. per pound, but has been gradually reduced until its present rate for anything over 44 lb. is 3d per pound.

Cincinnati News

By Kenneth D. Stern

Lieut. Hugh Watson, of Grisard Field, Blue Ash, Ohio, the Cincinnati Airport recently made a Government field, has admirably demonstrated how public interest may be awakened in aviation, its possibilities and accomplishments from the standpoint of the layman.

Every Sunday in the season when the weather has been fair this Fall, Lieutenant Watson has staged a free exhibition of stunt flying and passenger work aided by Lieut. Paul Riddle, his co-worker in commercial flying, and the Army Reserve pilots stationed at the field, Lieuts. Outcault, Robert Wheat, Slagle, and Wright Vermylia.

Although Grisard Field is 10 mi. from Cincinnati and inaccessible except by auto roads and an infrequent branch line railroad service, the city traction line ending 4 mi. away, and supplemented only by bus service to the field, on a fair Sunday afternoon the arriving visitor finds the boundaries of the field flanked by rows of the automobiles of air fans most of whom have journeyed out from the city. The average of air fans in attendance is 5000.

Whenever possible an outside attraction in the way of a flier or parachute jumper is brought to the field to entertain the audience.

Capt. George Rodgers of McCook Field was a recent visitor at the field and made several live jumps before the crowd, as was also Lieut. Harry Mills of McCook Field, the recent Pulitzer Trophy winner, with Capt. John Brown parachute jumper of McCook Field, who on a recent Sunday afternoon flew in from Milan, Ind., in a DH4 piloted by Mills. They arrived at dusk and rather than disappoint the crowd, for their appearance had been widely heralded, Captain Brown made a live jump from 2000 ft., this being his third jump for the day.

Grisard Field, named after the first Cincinnati flier who fell in the war, is a natural flying field, being the broad flat part of a knoll said to be the highest part of Hamilton County and comprises 101 acres and is naturally well drained. The longest runway is 2900 ft., and the field can accommodate large planes, as was demonstrated this past summer when Lieut. Harold Harriss, McCook Field test pilot, set a Martin Bomber down well within the limits of the field. Eddie Stinson, piloting an eight passenger Junkers plane from Chicago to Nashville, Tenn., also landed his plane easily in the field.

There is one hangar, standard Government size, 60 by 120 ft. with a capacity of twelve planes and another of the same size is to be erected in the spring of 1925.

Maj. E. L. Hoffman, A.S., is the commandant of the field which was dedicated two years ago, and has the record of never having a fatal accident. Much credit must go to Lieutenant Watson for his noteworthy efforts in awakening the public of Cincinnati to the new interests of aviation, and the results, shown by the increased public attendance at his meets, which his efforts have brought forth. Watson has flown 3200 flying hours over 700 of which are official Army hours, flown while he was an instructor at Kelly Field, San Antonio, Tex., during the war, and has never had an accident.

He is aided by the cooperation of the press of the city which runs notices beforehand of the exhibitions and attractions, and follows them up with accounts of their attendance and stunts.

There are ten planes in service at the field. The commercial planes owned and used by Lieutenants Watson and Riddle are Curtiss Standard J1's powered with Curtiss OXX6 and OX5 motors. The government ships are Curtiss Jenny's powered with 150 hp. Hissos.

A number of privately owned sport and pleasure planes are also kept at Grisard Field.

Major Hoffman and Lieutenant Watson extend cordial invitations to fellow fliers who happen to be flying over southern Ohio to drop in and visit the field.

International Air Navigation Commission

The International Commission for Air Navigation (C.I.N.A.), which was instituted under the provisions of the International Air Convention of 1919, held its seventh session on Oct. 10-14, last, at the Ministry of Foreign Affairs in Paris, France. The chairman was M. Pierre-Etienne Flandin, first delegate of France, and Albert Roper was general secretary.

Eighteen of the twenty-one nations parties to the Convention were represented. Following is the list of delegates: General Van Crombrugge (Belgium), Air Vice Marshal Brancker and Wing Commander Sewell (British Empire), M. Kiroff (Bulgaria), Z. Janack (Czechoslovakia), P. E. Flandin and Colonel Casse (France), Captain Botassis (Greece), Arturo Mercanti and General Piccio (Italy), M. Sugimura and Captain Usui (Japan), Colonel Guimaraes (Portugal), M. Racovitza (Rumania), Colonel Givkovitch (Serb-Croat-Slovene Kingdom), Carlos A. Pons (Uruguay).

The inaugural address was made by M. Edouard Herriot, Premier of France.

Under the International Convention the C.I.N.A. has very extended powers, for all amendments relative to the text of the Convention must be referred to it, and it is furthermore authorized to amend the text of the Annexes to the Convention of its own accord. For this purpose the C.I.N.A. has created technical sub-committees which deal with commercial aircraft operation, radio, meteorology, air legislation and maps.

The Commission decided, first, to adopt a standard atmosphere for international calculations of aircraft performance; second, to impose minimum safety factors for the issuance of airworthiness certificates to civil aircraft; and third, to make the issuance of private air pilot's certificates conditional upon a medical certificate showing the applicant's mental and physical fitness. In addition, the Commission has begun to examine the question of the navigating personnel required on board public aircraft, and that of the carriage of explosives and arms of war by air.

Other questions which were examined by the Commission include the following: (1) Exchange between the contracting states of all documents relative to national air legislation, (2) Publication of air navigation maps, (3) Exchange of weather reports, (4) Unification of terms and symbols used in aerodynamics, (5) Organization of first aid kits on board aircraft, (6) Night flying lighting on airports, (7) Air traffic rules, (8) Issuance of navigator's and meteorologist's certificates.

The closing address was made by M. Laurent-Eynac, French Under-Secretary of State for Aeronautics, who took this opportunity to urge those states who had signed the Convention but who had failed to ratify it to do so at the earliest opportunity.

The next session of the C.I.N.A. will take place in London, England, in April, 1925.

A. H. G. Fokker Arrives Here

Anthony H. G. Fokker, the Dutch airplane constructor, arrived last week in New York for a brief sojourn.

According to *The New York Times*, Mr. Fokker said he was manufacturing 500 airplanes a year in his plant in Holland.

"About 10 per cent of the planes built in Europe now," Mr. Fokker continued, "are used for commercial purposes and the remaining 90 per cent go to the armies and navies. Japan is also making her own airplanes under the direction of German engineers. We are supplying Spain, Italy and the Scandinavian countries with airplanes from our plant in Holland, as well as sending them to the Central and South American republics."

Mr. Fokker said that his plant in New Jersey had a capacity of 300 planes a year.

Santos-Dumont Honored

A memorial stone commemorating the first officially controlled airplane flight in France was unveiled on Nov. 12 by the Under-Secretary of Aviation, M. Laurent-Eynac, at Bagatelle, in the Bois de Boulogne, where M. Santos-Dumont covered 220 m. in 21⅕ sec. on Nov. 12, 1906.

Tributes to the Brazilian aviator in the French press recall how his exploit in the miniature plane, which resembled a toy more than a practicable flying machine, ended in a crash upon landing, demolishing the plane. It is also recalled that it later became known that the Wright brothers had already done better than this flight, but it is pointed out that Santos-Dumont's success owed nothing to the Wrights.

UNITED STATES AIR FORCES

U. S. ARMY AIR SERVICE

More Cloud Shooting Experiments

The rain making experiments which took place some time ago at McCook Field have just been resumed at Bolling Field, Anacostia, D. C. On Oct. 29, last, two Air Service pilots, Capt. A. I. Eagle and Lieut. W. E. Melville, using the electrified sand process devised by Dr. L. Francis Warren of Harvard University, successfully "shot down" a series of clouds which overshadowed the field.

Smaller groups disappeared entirely under the attack, while heavier masses were criss-crossed with artificial chasms through which the sun's rays piereed brightly to the earth.

The operations of the two planes were plainly apparent to spectators at the field. The two pilots were forced to climb 13,000 ft. before they reached the main strata of cumulus clouds, which was their objective. Through special binoculars they were seen to disappear behind a fragment and then suddenly to "break through" again as the cloud disintegrated under the shower of electrified sand thrown by centrifugal force through nozzles set in the under portion of the fuselages. The aviators described a circle above the cloud bank and the circle was duplicated in a clean cut pathway through the mist. From the ground it appeared that the cloud perceptibly lessened throughout its structure as the planes proceeded.

A projecting isthmus of cloud was dissipated as the planes skirted its edge spraying fine silica.

The airplanes and personnel were assigned to Dr. Warren by Major Gen. Mason M. Patrick, Chief of Air Service, at the suggestion of Secretary of War Weeks.

It was understood President Coolidge had expressed interest in the experiments and had indicated his hope that facilities for their continuation might be found. The Bolling Field group will make flights daily, the inventor said, during the next six weeks with a view to obtaining exhaustive data for the Governmental departments.

Dr. Warren described the work at Bolling Field as a "mere continuation of the invariably successful experiments of the last three years.

"We have had nothing happen in the last three years," he asserted, "to make us change our claims or our minds. We base our work on the assumption that visible forms of moisture in the air, like mists, fogs, clouds, are a form of colloidal suspension in gases and that they should be governed by the same general laws that prevail in colloidal action in liquids and solids.

"We fill the sand tanks on the planes with 120 mesh silica sand, the planes being equipped for charging the sand either positively or negatively by the turn of a lever. The sand, impinging upon the charging plates or falling through charging nozzles, is scattered by the air and driven back by the plane propeller.

"When a cloud is found to have a positive charge, we scatter negatively charged particles at the extreme top; and when it is found to have a negative charge we scatter positively charged particles at the top; and when it is found without any charge, we first charge it as we like and then bring it down by again scattering the opposite charged particles, etc.

"These tests have resulted in some cases in uncanny manifestations. For example, on July 8, at about 2 o'clock of the afternoon, a frightfully heavy thunderstorm with almost continuous lightning lay to the south of Phillips Field, over Chesapeake Bay. At 2:30 we attacked a small corner of this storm with a quantity of negatively charged sand—less than 10 lb.—and coincident with its application there was no more lightning and no more thunder. There followed a slow, gentle rain of about four hours' duration.

"A much better showing could have been made if we had planes that could widely scatter electrified sand at the rate of 1,100 lb. per minute. With the planes as they are now, we can release only 30 lb. per minute. The small planes with their light weight are all right for fog and all right for flirting with clouds, and have at least proved beyond doubt that the principle is correct and practicable, which means that a celestial epoch has been reached in the affairs of man. Commercial rainmaking now lies within the grasp of man and he can employ to this end one of nature's cheapest commodities, namely common or garden silica, at a cost of about $3 per ton, which, outside of maintaining the equipment and operating the planes, will be the only charge."

"Two of the larger planes would be quite sufficient to entirely squelch a dense fog covering 117 sq. mi. or more or a fog covering the city and harbor of New York.

"Should the Government provide the money and facilities to perfect, install and operate the process for large-scale work, with hundreds of planes designed and built to carry 3,000 lb. of sand to heights varying from 1,500 to 15,000 ft., it will have at its command the means of removing fog over its harbors, leading cities and elsewhere, and the power, further, to cause rainfall, as when and where needed, both in the East and in the dry and semi-dry sections of the country—provided, of course, that there are rain clouds present, local or otherwise, and that the air between the earth and the clouds is saturated to a degree beyond the point of evaporation, that is to say, at times when it sprinkles and does not rain."

Army Air Orders

First Lieut. Reuben C. Moffat, A.S., Selfridge Field, to Chief of A. S., Washington.

First Lieut. James A. Mollison, A.S., 79th Div. Org. Res., Philadelphia, to Penn. Nat. Guard, as instructor.

Sec. Lieut. Peter Sather, jr., A.S., Brooks Field, transferred to Field Art., with rank, at Fort Sam Houston.

First Lieut. Robert S. Heald, A.S., Brooks Field, to Kelly Field.

Each of the following officers, A.S., assigned to station indicated, upon completion of tour of foreign service: First Lieuts. Charles S. Prime, Marshall Field; Eugene L. Eubank, McCook Field; Harold A. Moore, Selfridge Field; Hiram W. Sheridan, Kelly Field; Ivan L. Proctor, Chanute Field; Stanton T. Smith, Selfridge Field; Audrey B. Ballard, Kelly Field; Russell H. Cooper, Chanute Field; Harold Brand, Brooks Field.

First Lieut. Harold H. Carr, A.S., Chanute Field, to New York City, sailing Jan. 28, 1925, via Govt. transp. for the Hawaiian Islands.

First Lieut. Charles L. Morse, A.S., McCook Field, to New York City, sailing Jan. 28, 1925, via Govt. transp. for the Hawaiian Islands.

First Lieut. George H. Brown, A.S., Chanute Field, to New York City sailing Jan. 28, 1925, via Govt. transp. for the Hawaiian Islands.

Sec. Lieut. Elmer Ginnellev Cross, A.S., Off. Res. Corps, Washington, to active duty Hampton, Va., reverting to inactive status June 30, 1925.

Spec. Orders 201, relating to Sec. Lieut. John Franklin McIntyre, jr., revoked.

Sec. Lieut. Russell Pyles, A.S. Off. Res. Corps, Hampton, Va., to active duty Langley Field, reverting to inactive status June 30, 1925.

Maj. Jacob H. Rudolph, A.S., Fairfield, Ohio, to McCook Field.

Sec. Lieut. James F. J. Early, A.S., Scott Field, to Phillips Field, Aberdeen, Md.

Sec. Lieut. Henry H. Ogden, A.S. Off. Res. Corps, en route to McCook Field, upon arrival to Selfridge Field.

Reserve Officers Complete Training

Two groups of Air Service reserve officers each spent two weeks of training at Fort Bliss, El Paso, Tex. The names of the reserve officers of the first group were mentioned in a previous issue of AVIATION. The reserve officers of the second group are as follows: Maj. Barnard Cummings, Craig, Colo.; Capt. Fred Feasel, Albuquerque, N. M.; Capt. James O. Nabours, Jr., Tucson, Ariz.; Capt. James G. Espey, Trinidad, Colo.; First Lieuts. Stanley P. Ricketts, Fort Collins, Colo.; Albert A. Sperry, Douglas, Ariz.; Louis C. Geisendorf, Eastland, Tex.; Second Lieuts. Charles M. Wightman, Dewey Bartlo and Charles G. Stanton, Phoenix, Ariz.; Harry W. Hantsche, Hurley, N. M.; Earl L. Byaers, Breckenridge, Tex.; John P. Hausner, Gallup, N. M.; and Earl K. Parker, Denver, Colo.

Aerial Gunnery Practice at Ellington Field

During the last week of the specialized bombardment training, eight Martin Bombers of the 40th School Squadron, Kelly Field, under the command of Lieut. Odas Moon, carried an expedition to Ellington Field, Houston, Tex., for the purpose of engaging in aerial gunnery practice. The expedition included fourteen students in Specialized Bombardment Training, the necessary crews and personnel to establish and maintain a camp and care for the planes. A few supplies necessary were taken in three motor trucks. The problem was very successful and afforded much valuable instruction of a kind which is not possible in the vicinity of Kelly Field. It gave the students training not only in aerial gunnery, but in cross-country flying and maintenance of airplanes at temporary airdromes at a distance from their base of operations.

France Field Fliers Visit Costa Rica

A flight of four DeHaviland planes, commanded by Maj. Junius W. Jones, and including Lieuts. Irwin S. Amberg, William K. Moran and Edward M. Robbins, pilots, Lieut. Charles T. Skow, radio officer, with the enlisted personnel consisting of three mechanics, left France Field, Panama Canal Zone, on Aug. 30 for Costa Rica on a visit of courtesy to extend over the Fiesta. They arrived at San Jose at 2:30 p. m. the same afternoon and were royally received by Mr. Davis, the American Minister, and Colonel Bonillia, Chief of Staff. The trip to San Jose, 350 mi., was covered in 5 hr. 35 min. The return trip was accomplished in 5 hr. 40 min.

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A Suggested National Air Policy

That a National Aviation Policy is needed by the United States is obvious. To get such a policy in concrete form AVIATION *requested several thoughtful friends of aeronautical progress to make suggestive and constructive recommendations. Some of them are given below and will be printed each week with additions, omissions and such other changes as appear to be helpful toward the formulation of a sound national air policy. Readers of* AVIATION *and others can render no greater service to the cause of aeronautical progress than contributing their comments and suggestions.*

GOVERNMENTAL.

A continuing program of aircraft development both governmental and commercial.
A civilian, charged with championing a national air policy, is needed in the Government. **Cabinet*
Aircraft committees in the House and Senate to hold aircraft hearings where civilians as well as government officials can express their opinions. **composed of fliers.*
A detailed aircraft budget for all Governmental Departments, and an annual statement of all expenditures.
An experienced staff of flying officers at the head of all governmental air defense services.
Coordination of all procurement and experimental aircraft work of the government under one agency.
**Co-ordination of the aircraft experimental development of the government leaving procurement to the various branches themselves.*
Limitation of government manufacture to repair of aircraft and specialized work that cannot be done by private firms. **No limitation on experimental construction.*
The elimination of the duplication of aerial functions and facilities by government departments.
A country wide Air Mail system of trunk lines connecting the principal cities of the country. **Retirement law for air mail pilots.*
Establishment of a National Airway System through cooperation of the Federal Government with States and Cities. **A landing field in every large city.*
A national aircraft law that will regulate aviation, administered by practical pilots and experienced aeronautical engineers. **and federal air police.*
Membership of the United States in the International Convention for Air Navigation.
**Increased governmental appropriations for aerial development.*
**Encouragement of aviation rather than subsidy.*

COMMERCIAL AIRCRAFT OPERATION.

Creation of commercial air lines by private enterprise or government subsidy.
Encouragement of participation by private companies in aircraft races and competitions.
Encouragement of the training of pilots by civilian schools.
Creating an Esprit de Corps among flying men all over the country by frequent gatherings at aviation meets.
**Encouragement of safe and sane flying.*
**A continuing organization, including representatives of all important points of view in aeronautics, for the discussion of standards for aeronautics where standardization is desirable.*

INDUSTRIAL AIRCRAFT CONSTRUCTION.

Recognition that a sound aeronautical industry is a prime necessity of our National Defense.
An active industrial association that will coordinate the aircraft industry and defend it from attack.
Encouragement of the designing of new types of aircraft by manufacturers by allowing them to retain their proprietory rights.
Concentration of manufacturing firms on specialized types of army and navy aircraft. **When production demands are heavy.*
Encouragement of research by constructors, universities and other agencies as well as by the government.
Encouragement of an annual design competition for commercial aircraft.

CIVILIAN.

A national aeronautical organization composed of public spirited citizens that will take a strong position of leadership on national aeronautical policy. **Unification of all aeronautical organizations into one national association with chapters in all cities and towns.*
An Annual Aviation Week during which the country will think of aerial progress. **52 such weeks.*
The formation of local aero clubs by fliers for the purpose of stimulating flying in all localities.
Encouraging the public to fly and patronize the air mail and transport facilities.
**The encouragement of gliding and soaring contests, especially interscholastic:*

*Suggested changes.

THE Aircraft Service Directory

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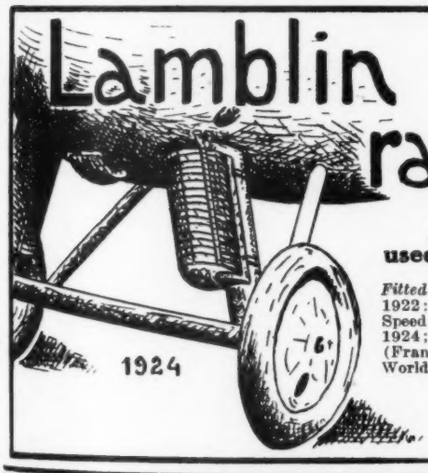

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